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ILLUSTRATIONS OF FUNGI—XII

WILLIAM A. MURRILL

The figures on the accompanying plate[1] were all drawn from specimens collected in and near Bronx Park, New York City, and represent a few of the many attractive and highly-colored species included in the genus *Russula*. This very difficult genus is now being monographed for NORTH AMERICAN FLORA by Dr. Gertrude S. Burlingham, who has kindly determined for me the species here figured.

Most of the members of this genus are edible, and some of them are particularly good, but they are usually scattered, are fragile and perishable, become infested early with a variety of insects, are eaten by squirrels and other animals, and resemble one another so closely that it is advisable to go to the trouble of tasting nearly every specimen before selecting it for the table. There are no violently poisonous species known in this genus, and if specimens have a mild taste and an agreeable odor they are probably harmless, but it must always be remembered that it is necessary to test each new species thoroughly before using it in any quantity for food. The botanical characters of the genus are not difficult to learn, and it may be distinguished from the nearest related genus, *Lactaria*, by the absence of a milky juice in the tissues of the sporophore.

[MYCOLOGIA for September, 1912 (4: 231–287), was issued August 28, 1912]

[1] This plate should be numbered 76 instead of 74.

Russula sericeonitens Kauffman

SILKY-SHINING RUSSULA

Plate 76. Figure 1. × 1

Pileus regular, convex to plane or depressed, gregarious, reaching 9 cm. broad; surface smooth, rather viscid, dark-purple, blackish-purple at the center, not striate on the margin; context rather thick, white, mild to the taste, odor not characteristic; lamellae white, becoming slightly yellowish with age but not ochraceous; spores subglobose, roughly tuberculate, hyaline, 8–10 μ; stipe cylindric, equal, smooth, dry, milk-white, 5–7 cm. long, scarcely 2 cm. thick.

Collected on the ground in oak woods near Bronx Park, New York City, September 10, 1910, by W. A. Murrill. Described in 1909 from northern Michigan, where it is not uncommon in mixed woods during July and August, usually growing solitary. The spores of the typical plant are recorded as 6–7.5 μ.

Russula Mariae Peck

MARY'S RUSSULA

Plate 76. Figures 2 and 8. × 1

Pileus fleshy, convex and subumbilicate to depressed, reaching 7 cm. broad; surface dry, rose-red or purple with darker disk, having a bloom like a peach, margin slightly striate at times, especially in old plants; context thin, of good flavor, white, pinkish under the cuticle, odor not characteristic; lamellae white or stramineous, broad, subcrowded, interveined; spores subglobose, minutely conic-tuberculate, yellow, 7 μ; stipe equal, solid, rosy, sometimes partly white, glabrous, about 1.3–1.5 cm. thick.

Common under oaks throughout the eastern United States. Figure 8 represents the more usual form; figure 2 shows a variety having lilac or violet tints with a beautiful white bloom or pruinosity. This is one of our prettiest species, as well as one of the best for the table.

Russula emetica Fries

EMETIC RUSSULA

Plate 76. Figure 3. × 1

Pileus regular, firm to fragile, convex to plane or depressed, 5–8 cm. broad; surface viscid when young, polished, red, often

fading to pallid or yellowish, cuticle separating very readily; context white, reddish under the cuticle, very acrid to the taste; lamellae white, then dull-yellowish, free, subdistant, broad, equal; spores globose, echinulate, hyaline, 8–10 μ; stipe rosy or whitish, glabrous, spongy-solid, 3–7 cm. long, 1–1.5 cm. thick.

Common in woods throughout Europe and the eastern United States, often growing where logs have decayed. Distinguished by its red color, viscid surface, readily separating cuticle, and very acrid taste. In addition to its acrid quality, it is definitely poisonous, containing small quantities of choline, pilzatropine, and probably muscarine. When taken in any quality, it acts as a prompt emetic. It is mainly because of this species that most specimens of *Russula* should be tasted before selecting them for food.

Russula sulcatipes sp. nov.

FURROWED-STEMMED RUSSULA

Plate 76. Figure 4. × 1

Pileus convex to plane or depressed, reaching 7 cm. broad; surface dry, pruinose, smooth, pale avellaneous-isabelline, slightly striate on the margin, becoming more conspicuously so on drying; context very thin, white, very firm, mild and nutty to the taste, odor not characteristic; lamellae white, becoming cream-colored or somewhat darker on drying, adnate, plane, subdistant; spores globose, roughly tuberculate, hyaline under a microscope, 7–9 μ; stipe equal or slightly enlarged below, with rather conspicuous longitudinal raised lines, milk-white, glabrous, solid, about 5 cm. long and 1.3 cm. thick.

Type collected on the ground in oak woods near Bronx Park, New York City, September 10, 1910, by W. A. Murrill.

Russula obscura Romell

OBSCURE RUSSULA

Plate 76. Figure 5. × 1

Pileus convex to expanded or depressed, reaching 12 cm. broad; surface slightly viscid, vinosous at the center, much paler vinosous toward the margin, slightly striate on the immediate margin, usually decorated with bits of earth and leaves that are carried upward as the sporophore emerges from the soil; context white, at first mild, at length somewhat peppery; lamellae white or

straw-yellow when viewed perpendicularly, becoming somewhat cinereous or discolored on drying; spores subglobose, roughly tuberculate, hyaline, 8 μ; stipe white with a cinereous tint, smooth, ochraceous, solid, 6 × 2–2.5 cm.

Collected on a rather dry bank at the edge of oak woods near Bronx Park, New York City, May 22, 1910, by W. A. Murrill. Described from Sweden.

Russula uncialis Peck

INCH RUSSULA

Plate 76. Figure 6. × 1

Pileus thin, very fragile, convex to plane or depressed, 2.5–4.5 cm. broad; surface dry or slightly viscid, glabrous or minutely granulose, at times obscurely striate on the margin, red or rosy with incarnate or testaceous hues; context thin, white, of mild flavor, without odor; lamelae white, becoming stramineous or cremeous, interveined, subcrowded, narrow behind; spores globose, rough, hyaline, 7–8 μ; stipe equal or enlarging below, glabrous, spongy or stuffed, milk-white, rarely reddish, 2.5–4 cm. long, 4–10 mm. thick.

Collected under an oak on the grounds of the New York Botanical Garden. Found sparingly in certain localities in the eastern United States.

Russula foetens Pers.

FETID RUSSULA

Plate 76. Figure 7. × 1

Pileus firm, rather thin, globose to plane or slightly depressed, 5–10 cm. broad; surface very viscid, slimy, conspicuously striate-tuberculate, ochraceous-melleous, testaceous-fulvous in the center with small bay or blackish areas; context whitish, tardily acrid and mucilaginous to the taste, with odor of prussic acid; lamellae mostly equal, adnate or adnexed, subcrowded, arcuate, white, staining brownish when injured, usually decorated with small drops of water when the air is damp; spores globose, strongly echinulate, hyaline, 10 μ; stipe cylindric, equal or somewhat ventricose, glabrous or subglabrous, white, staining brownish when injured, hollow, 5–8 cm. long, 1–2 cm. thick.

This conspicuous species is common under oaks in groves or

woodlands throughout most of Europe and the United States, sometimes occurring in great quantity in one spot. Its odor is similar to that of peach kernels, and in some specimens it is strong and unpleasant, although at times it may be scarcely noticeable. This unpleasant odor and the very slimy character of the surface render the plant unattractive and one would hardly collect it for food. It is known to be definitely poisonous to a certain extent and should always be avoided by mycophagists.

Russula rubriochracea sp. nov.

RED AND YELLOW RUSSULA

Plate 76. Figure 9. × 1

Pileus convex to plane or slightly depressed, reaching 6 cm. broad; surface red or purple with a bloom, darker in the center, not at all striate, dry, smooth, margin entire, concolorous; context white, thin, taste at first nutty, becoming distinctly but not violently acrid, odor not characteristic; lamellae exactly ochraceous even in a very young stage, adnexed, plane, subdistant; spores subglobose, roughly tuberculate, hyaline under a microscope, ochraceous in mass, 8–11 μ; stipe tapering below, smooth, dry, glabrous, pale rose-colored or lilac, about 4.5 cm. long and 1.3 cm. thick.

Type collected on the ground in oak wooks near Bronx Park, New York City, September 10, 1910, by W. A. Murrill. Related to *R. Mariae*, but estriate, acrid, and with yellow lamellae.

NEW YORK BOTANICAL GARDEN.

THE AGARICACEAE OF THE PACIFIC COAST—III

WILLIAM A. MURRILL

(WITH PLATE 77, CONTAINING 2 FIGURES)

The species here treated have brown or black spores. Some of them are celebrated for their edible qualities. No dangerously poisonous species are known to belong to this group, although many of them have not been tested.

Spores brown.	
Annulus present.	
Lamellae free.	1. AGARICUS.
Lamellae adnate.	2. STROPHARIA.
Annulus absent; veil appendiculate.	
Scattered or subcespitose, rarely densely cespitose; surface hygrophanous, viscid, or squamulose.	3. DROSOPHILA.
Densely cespitose; surface firm, dry, glabrous.	4. HYPHOLOMA.
Spores black or olivaceous.	5. GOMPHIDIUS.

1. AGARICUS (Dill.) L. Sp. Pl. 1171. 1753

1. AGARICUS CAMPESTRIS L. Sp. Pl. 1173. 1753

Seattle, Washington, *Zeller 109;* Golden Gate Park, California, *Murrill 1114;* La Honda, California, *Murrill & Abrams 1251, 1277;* Stanford University, California, *Nohara 2, Miss Patterson 17, Baker 130;* California, *Harper;* Kadiak, Alaska, *Trelease 504.*

2. AGARICUS CALIFORNICUS Peck, Bull. Torrey Club **22**: 203. 1895

Pileus at first subconic, becoming convex, minutely silky or fibrillose, whitish, tinged with purple or brownish-purple on the disk; flesh whitish; lamellae close, free, pink becoming purplish, then blackish-brown; stem rather long, solid or stuffed, equal or tapering upward, distinctly and rather abruptly narrowed above the entire, externally silky annulus, pallid or brownish; spores broadly ellipsoid, $5–6 \times 4–5\ \mu$.

Pileus 2.5–7.5 cm. broad; stem 4–7.5 cm. long, 4–8 mm. thick.

Type collected by McClatchie under oak trees near Pasadena, California. Said by the author to resemble *A. haemorrhoidarius* in size, shape, and habitat, but to differ in color and surface adornment. According to Baker, it is abundant and much collected for food in pastures and lawns about Stanford University.

Pasadena, California, *McClatchie;* Stanford University, California, *Baker 123, Dudley 179, Nohara 39;* Searsville, California, *W. G. Johnston.*

3. AGARICUS HAEMORRHOIDARIUS Fries, Hymen. Eur. 281. 1872

Berkeley Camp, California, *Harper.* The specimens were determined as above by Professor Harper when collected. They also agree with plants at Albany so determined by Dr. Peck.

4. AGARICUS SILVICOLA Sacc. Syll. Fung. **5**: 998. 1887

Agaricus campestris silvicola Vitt. Fung. Mang. 43. 1835.
Agaricus bulbosus McClatchie, Proc. S. Cal. Acad. Sci. **1**: 382. 1897.

This species was found commonly in woods. The spores are rather small, measuring $5 \times 3.5\,\mu$.

Seattle, Washington, *Murrill 231, 281, 478, 581, Zeller 106;* Stanford University, California, *McMurphy 133, Miss Patterson 3, 33.*

5. AGARICUS PLACOMYCES Peck, Ann. Rep. N. Y. State Mus. **29**: 40. 1878

Seattle, Washington, *Murrill 285, 524;* Muir Woods, California, *Murrill 1130.* The specimen from Muir Woods was avellaneous-umbrinous at the center, becoming blackish on drying, and the stipe below the annulus was prominently marked with close, concentric, irregular ridges.

6. AGARICUS SILVATICUS Schaeff. Fung. Bav. 62. 1800

Tacoma, Washington, *Murrill 722:* surface densely covered with large reddish-brown scales; spores ellipsoid, $6 \times 3.5\,\mu$.

Searsville Lake, California, *McMurphy 115:* scales more broken into fibrils and color somewhat darker, but otherwise like the Washington plants.

7. AGARICUS PATTERSONAE Peck, Bull. Torrey Club **34**: 347. 1907

Pileus fleshy, firm, convex or nearly plane, glabrous or minutely silky, white or whitish, often mottled with brownish squamules; flesh firm, white, taste fungoid; lamellae close, free, pink, becoming blackish-brown or black with age; stem equal or slightly tapering upward, firm, stuffed, bulbous, white or whitish, the annulus white, often rupturing and partly adhering to the margin of the pileus; spores broadly ellipsoid, 8–9 μ long, 5–6 μ broad.

Pileus 6–14 cm. broad; stem 7–12 cm. long, 2–3 cm. thick.

Described from specimens collected by Miss Patterson under pine and cypress trees at Stanford University, California. The types at Albany are in poor condition, but the photograph accompanying them shows imbricated fibrils and scales over the surface similar to those of the dark form of *A. campestris,* to which it seems closely related.

Stanford University, California, *Miss Patterson 18.*

8. **Agaricus hondensis** sp. nov.

Pileus convex to plane or somewhat depressed, solitary, 7 cm. broad; surface dry, smooth, glabrous, white to slightly purplish-black, the center concolorous; lamellae free, crowded, ventricose, at length fuliginous; spores ellipsoid, smooth, pale purplish-brown under a microscope, 5 × 2.5 μ; stipe somewhat fusiform with a small bulb, dry, smooth, glabrous, white, 9 cm. long, 1 cm. thick at the center; annulus ample, simple, persistent, fixed, superior.

Type collected in sandy loam under redwoods at La Honda, California, November 25, 1911, *W. A. Murrill & L. R. Abrams 1260.*

9. AGARICUS BIVELATUS Peck, Bull. Torrey Club **36**: 335. 1909

Pileus fleshy, thin, broadly convex, radiately fibrillose and floccose, cream-colored slightly tinged with pink, smoky-brown in the center; lamellae thin, close, free, pink then seal-brown; stem

equal or slightly bulbous, glabrous, shining, white-floccose at the top, stuffed or hollow, cream-colored, with a narrow double annulus which at length disappears; spores subglobose, 5–6 μ × 4–5 μ.

Pileus 4–5 cm. broad; stem 3.5–6 cm. long, 8–11 mm. thick.

Described from specimens collected by Baker under oaks at Claremont, California.

10. AGARICUS SUBNITENS Peck, Bull. Torrey Club **36**: 335. 1909

Pileus fleshy, broadly convex or slightly depressed in the center, densely fibrillose, shining on the margin, cream- or tan-colored; flesh white; lamellae thin, close, free, pink becoming dark-brown; stem equal or slightly thickened below, stuffed or hollow, white and fibrillose above, cream-colored and shining below with a finally deciduous brown but white-margined annulus; spores ellipsoid, purplish-brown, 6–8 μ × 4–5 μ.

Pileus 4.5–9.5 cm. broad; stem 8.5–13 cm. long, 1–1.5 cm. thick.

Described from specimens collected by Baker under oaks at Claremont, California. Apparently not sufficiently distinct from *A. bivelatus*.

11. **Agaricus bivelatoides** sp nov.

Pileus truncate-conic to convex with a large umbo, not fully expanding, drying thin, 4 cm. broad; surface minutely imbricate-fibrillose, dry, uniformly pale-avellaneous throughout; lamellae free, crowded, ventricose, becoming fuliginous; spores ellipsoid, smooth, purplish-brown, 5 × 2.5 μ; stipe enlarging below, with very small bulb, subconcolorous, minutely fibrillose, 6 cm. long, 4–6 mm. thick; annulus superior, simple, fixed, persistent, white.

Type collected on the ground under redwoods near Seattle, Washington, October 20–November 1, 1911, *W. A. Murrill 493*. Related to *A. bivelatus* Peck.

12. **Agaricus comptuloides** sp. nov.

Pileus small, thin, conic to convex, umbonate, solitary, 3 cm. broad; surface rosy-isabelline to whitish, pinkish-brown to fulvous on the umbo, dry, slightly fibrillose-scaly, margin entire, concolorous; lamellae free, crowded, plane, becoming fuliginous; spores ellipsoid, smooth, pale-purplish under a microscope, 5 × 2.5 μ; stipe smooth, polished, enlarged and white below, pinkish

above, becoming yellowish throughout on drying, 7 cm. long, 4 mm. thick above, 8 mm. thick below; annulus white to yellow, membranous, ample, persistent, fixed just above the middle of the stipe.

Collected in humus on the ground in woods near Seattle, Washington, October 20–November 1, 1911, *W. A. Murrill 434 (type), 523.* Related to *A. comptulus* Fries and *A. diminutivus* Peck.

13. **Agaricus flavitingens** sp. nov.

Pileus hemispheric to broadly convex, not umbonate, drying thin, gregarious, 6 cm. broad; surface dry, smooth, imbricate-fibrillose-scaly, fulvous with a latericeous tint at the center, fading out to stramineous toward the margin; lamellae free, ventricose, not crowded, avellaneous to umbrinous; spores ovoid, smooth, purplish-brown, 4–5 × 3–4 μ; stipe cylindric, slightly larger at the base, smooth, glabrous, white above the annulus, ochraceous-tinted below, 5 cm. long, 1 cm. thick; annulus ample, membranous, persistent, fixed about the center of the stipe, white, changing to yellow on drying.

Type collected in sandy soil in fir woods near Seattle, Washington, October 20–November 1, 1911, *W. A. Murrill 381.*

14. **Agaricus Hillii** sp. nov.

Pileus regular, convex, thick and fleshy, solitary, 5–10 cm. broad; surface smooth, dry, subglabrous, white, slightly grayish-brown at the center, becoming pale-bay at the center on drying, margin thin, entire, decorated with fragments of the veil; context white to slightly pinkish, not changing, with pleasant taste and odor; lamellae free, crowded, broad, ventricose, pink to fuliginous; spores ellipsoid, smooth, purplish-brown under a microscope, 5–6 × 3.5 μ; stipe bulbous, tapering upward, smooth, glabrous, white, pinkish above the annulus, stuffed or hollow, 7–10 cm. long, 8–12 mm. thick; annulus superior, simple, white, large, persistent.

Type collected among moss and humus in open woods on Mayne Island, Gulf of Georgia, British Columbia, December 12, 1904, *Albert I. Hill 104.*

15. **Agaricus Abramsii** sp. nov.

Pileus irregular, owing to the position of the plant, thick, fleshy, plane, solitary, 6 cm. broad; surface dry, finely imbricate-

scaly, whitish with a rosy tint; lamellae free, crowded, narrow, plane, pallid; spores ovoid, smooth, hyaline to pale-umbrinous under a microscope, 6–7 × 3.5–4 μ; stipe eccentric, fusiform, white, polished, hollow, 6 × 2 cm.; annulus near the base, white, not conspicuous.

Type collected on a clay bank by the roadside at 800 ft. elevation on the Santa Cruz Mountains near Palo Alto, California, November 25, 1911, *W. A. Murrill & L. R. Abrams 1227*. Distorted, owing to its position on the side of the bank.

16. **Agaricus subrufescentoides** sp. nov.

Pileus convex to subexpanded, slightly umbonate, thick and fleshy, solitary, reaching 10 cm. broad; surface dry, smooth, whitish, densely covered with imbricate, delicately-fibrillose, rufescent scales, except at the center, where it is glabrous and fulvous to bay; lamellae free, rather close, ventricose, pallid to pale-purplish; spores narrowly ellipsoid, obliquely pointed at the base, smooth, pale purplish-brown, 6–7 × 3.5 μ; stipe tapering upward, not bulbous, glabrous, white, staining slightly reddish-brown when bruised, 7 cm. long, 1–1.5 cm. thick; annulus ample, membranous, simple, white, staining slightly reddish-brown, fixed, superior.

Type collected on the ground in woods near Seattle, Washington, October 20–November 1, 1911, *W. A. Murrill 591*. Also collected near Tacoma, Washington, October 26, 1911, *W. A. Murrill 720*.

17. **Agaricus McMurphyi** sp. nov.

Pileus rather thick and fleshy, convex to expanded, solitary, 15 cm. broad; surface moist, smooth, light-gray with purplish-brown fibrils, margin somewhat ragged with portions of the veil; context white, not changing when bruised, with taste and odor similar to that of *A. campestris;* lamellae free, several times inserted, rather broad, ventricose, crowded, becoming very dark brown; spores ellipsoid, smooth, dark-purplish under a microscope, 5–6 × 3–3.5 μ; stipe subequal with a prominent bulb, subglabrous, stuffed, whitish below to purplish-brown above, 13 cm. long, 2 mm. thick; veil thin, membranous, leaving a permanent, median annulus.

Type collected on the ground under redwoods near Searsville Lake, California, January 6, 1903, *James McMurphy 35*.

18. **Agaricus crocodilinus** sp. nov.

Pileus thick, convex, not fully expanding, solitary, reaching 35 cm. broad; surface white, conspicuously ornamented with large gemmate warts originating from the cracking of the epidermis, causing it to resemble the skin of a crocodile; lamellae broad, ventricose, crowded, narrowed behind; spores ellipsoid, obliquely pointed at the base, smooth, uniguttulate, dark purplish-brown, 11–13 × 6–7 μ; stipe short, white, smooth, glabrous, 12 × 6 cm., very much inflated at the center, where it reaches 9 cm. or more thick; veil superior, white, membranous. (*pl. 77.*)

Type collected on the ground at Ferndale, Humboldt Co., California, by H. J. Smith, who tested it and found it edible.

2. STROPHARIA (Fries) Quél. Champ. Jura Vosg. 110. 1872

1. STROPHARIA AERUGINOSA (Curt.) Quél. Champ. Jura Vosg. 110. 1872

California, *Harper 7;* Stanford University, California, *McMurphy 151.*

2. STROPHARIA SEMIGLOBATA (Batsch) Quél. Champ. Jura Vosg. 112. 1872

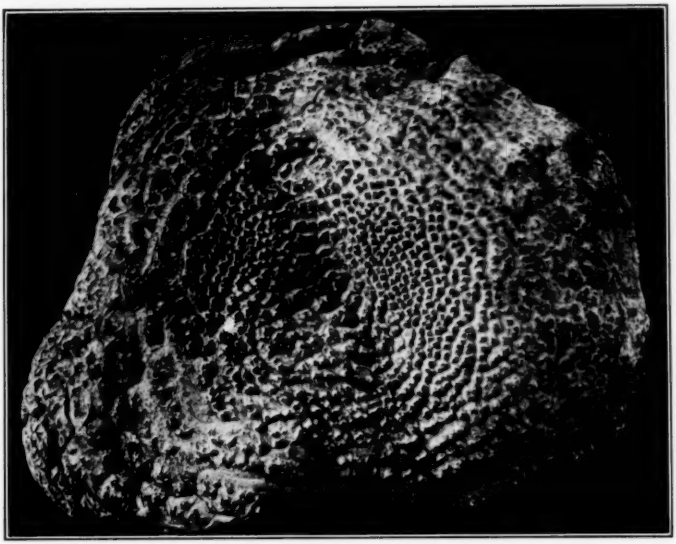
See MYCOLOGIA for January, 1912, where this species is described and illustrated in color.

Tacoma Prairies, Washington, *Murrill 713;* Corvallis, Oregon, *Murrill 970, 973, 997;* Stanford University, California, *Dudley 184, Miss Kidwell 95, McMurphy 112;* Searsville Lake, California, *McMurphy 98.*

3. STROPHARIA STERCORARIA (Fries) Quél. Champ. Jura Vosg. 112. 1872

Similar to *S. semiglobata* in habit and appearance, but gills becoming brownish-black or greenish-black instead of cloudy-black, and spores larger and lighter in color, appearing olivaceous under a microscope. The spores of both species are immense and vary considerably in size.

Stanford University, California, *Miss Patterson 15, 30, 40,*



AGARICUS CROCODILINUS MURRILL

Dudley 75, Nohara 40, Abrams 200; near Palo Alto, California, *Baker 377;* Berkeley, California, *Harper;* near Searsville Lake, California, *McMurphy 47.*

4. STROPHARIA MAGNIVELARIS Peck; Harriman Alaska Exped. Crypt. 44. 1904

Pileus convex, becoming nearly plane, sometimes umbonate, glabrous or obscurely radiately fibrillose or fibrillose-squamose with innate or appressed fibrils, ochraceous-buff when dry; lamellae moderately close, blackish-brown when mature; stems long, slender, glabrous, solid, slightly thickened at the base, whitish, the ring large, membranous, white, persistent; spores ellipsoid-oblong, 14–16 μ long, 7–8 μ broad.

Pileus 2–3 cm. broad; stem 5–7 cm. long, 2–4 mm. thick.

Described from specimens collected on the ground at Yakutat Bay, Alaska, *Trelease 501, 503.* The types at Albany resemble *S. stercoraria,* but have a larger ring, darker gills, and a more radiate-rugose or subsquamose cap.

5. **Stropharia semigloboides** sp. nov.

Pileus convex, thin, solitary, 1.5 cm. broad; surface smooth, glabrous, shining, somewhat viscid when young, cremeous, ochraceous at the center; lamellae adnate, plane, distant, pale-grayish to fumosous, the edges white; spores oblong-ellipsoid, smooth, 2-guttulate, subhyaline with a faint yellowish-brown tint under a microscope, $8 \times 4\,\mu$; stipe radicate, tapering upward, smooth, glabrous, white, slightly tinted with yellow at the base, 10 cm. long, including the root, 5–8 mm. thick; veil ample, white, fixed, persistent, fimbriate at the margin, colored above with the purplish spores.

Type collected among leaves in woods near Seattle, Washington, October 20–November 1, 1911, *W. A. Murrill 435.* Resembling *Stropharia semiglobata,* but differing in habitat, with much paler gills and different spore characters.

6. **Stropharia longistriata** sp. nov.

Pileus conic to convex, more or less umbonate, thin, gregarious, 2.5–5 cm. broad; surface hygrophanous, glabrous, radiate-rugose, isabelline to dark-cream on the umbo, whitish to dull-brown on the long-striate margin; lamellae adnate, narrow, plane, not

crowded, often whitish on the edge, pallid to purplish-brown; spores ellipsoid, smooth, 1–2-guttulate, pale-purplish under a microscope, $7 \times 3.5 \mu$; stipe milk-white throughout, smooth, glabrous, tapering upward, hollow, about 6 cm. long and 5 mm. thick; annulus very large, persistent, median, fixed, funnel-shaped.

Collected in abundance on rich earth and decayed chips in an opening in woods near Seattle, Washington, October 20–November 1, 1911, *W. A. Murrill 233 (type), 527, 604, Zeller 89, 122.* Also collected on the ground among dead sticks in woods at Newport, Oregon, *W. A. Murrill 1074.* Similar to *Hypholoma appendiculatum* in general appearance, but always furnished with a conspicuous, persistent annulus.

7. STROPHARIA BILAMELLATA Peck, Bull. Torrey Club **22**: 204. 1895

Pileus fleshy, convex, even, whitish or yellowish, flesh pure-white; lamellae close, adnate, purplish-brown when mature; stem short, solid, white, with a well-developed pure-white annulus which is striately lamellate on the upper surface; spores ellipsoid, purplish-brown, $10 \times 5–6 \mu$.

Pileus 2.5–5 cm. broad; stem about 2.5 cm. long, 6–8 mm. thick.

Described from specimens collected by McClatchie (840) in grass on the streets of Pasadena, California. With the types at Albany, are specimens collected by Braendle at Washington, D. C., which appear to be identical.

3. DROSOPHILA Quél. Ench. Fung. 115. 1886

It seems best to separate the genus *Hypholoma* as ordinarily known into two groups, one containing the densely cespitose species, such as *H. sublateritium,* which form a natural group, and the other containing *H. appendiculatum, H. lacrymabundum,* and their relatives.

1. DROSOPHILA APPENDICULATA Quél. Ench. Fung. 116. 1886

Hypholoma appendiculatum (Bull.) Quél. Champ. Jura Vosg. 115. 1872.

Hypholoma cutifractum Peck, Bull. Torrey Club **22**: 490. 1895.

Hypholoma flocculentum McClatchie Proc. S. Cal. Acad. Sci. **1**: 381. 1897.

Described and figured in MYCOLOGIA for January, 1912. A very abundant and widely distributed edible species.

California, *Miss Patterson, H. S. Fawcett, McClatchie, Baker.*

2. **Drosophila atrofolia** (Peck)

Hypholoma atrofolium Peck, Bull. Torrey Club **23**: 417. 1896.

Pileus submembranous, at first convex or hemispheric, then broadly convex, commonly umbonate, minutely and irregularly furrowed, striate to the apex when mature, hygrophanous, burnt-umber or wood-brown when moist, fading to pale-tawny or cream color in drying, veil fugacious; lamellae subdistant, adnate, at first pale-brown or drab, then dark seal-brown, almost black; stem slender, fibrillose, hollow, pallid or cream color; spores very dark brown, ellipsoid, $10 \times 5\,\mu$; pileus 18–48 mm. broad; stem 2.5–6 cm. long, 2–3 mm. thick.

Described from plants collected by McClatchie among bushes at Pasadena, California. At Albany, specimens from California collected by Copeland and also from Ohio collected by Lloyd bear this name. The gills of the type are almost black when mature, suggesting *Psathyrella,* but its relationships are nearer *Hypholoma,* according to the author.

3. **Drosophila longipes** (Peck)

Hypholoma longipes Peck, Bull. Torrey Club **22**: 204. 1895.

Pileus thin, campanulate, even or obscurely striate on the margin, fibrillose becoming glabrous, hygrophanous, yellowish-brown when moist, brown or isabelline-brown when dry, the margin appendiculate with the very white, floccose, fugacious veil; lamellae narrow, close, adnate, white or whitish, becoming nearly black, often whitish on the edge; stem slender, long, hollow, striate at the top, white, with a mycelioid tomentum at the base; spores ellipsoid, $12.5 \times 7.5\,\mu$.

Pileus 2.5–3 cm. broad; stem 5–12.5 cm. long, 2–5 mm. thick.

Described from specimens collected by McClatchie in very wet weather among fallen leaves near Pasadena, California. Very thin and fragile, with stipe hollow to the very apex. Specimens at Albany from California sent to Dr. Peck by Miss Patterson in 1907 are incorrectly referred to this species.

4. **Drosophila campanulata** (Peck)

Hypholoma campanulatum Peck, Bull. Torrey Club **36**: 336. 1909.

Pileus thin, campanulate, dry, somewhat shining, glabrous, sometimes slightly appendiculate with fragments of the white veil, ochraceous; lamellae thin, close, nearly free, pale-brown becoming dark-brown, whitish on the edge; stem long, equal, glabrous, hollow, white or cream-colored with a soft white tomentum at the base; spores blackish-brown, ellipsoid-oblong, 8–10 × 4–5 μ.

Pileus 3–4 cm. broad; stem 8–13 cm. long, 4–7 mm. thick.

Described from specimens collected by Baker in open ground among shrubs, grass, and weeds, at Claremont, California. Probably too closely related to *H. longipes* Peck, according to specimens examined at Albany.

5. **Drosophila californica** (Earle)

Hypholoma californicum Earle, Bull. N. Y. Bot. Gard. **2**: 344. 1902.

Densely cespitose on or near the base of oak stumps; pileus thin, 5–5.5 cm., convex, then expanded and subumbonate, deep rich-brown, smooth, hygrophanous, margin entire (or obscurely striate in dried specimens); lamellae adnexed or subfree, subcrowded, slightly ventricose, pale-brown at first then darker; spores dark purplish-brown, oblong-ellipsoid, 5–6 × 3 μ; veil white, of thin fibers soon breaking away from the stem but more closely woven toward the margin, appendiculate; stalk 7–10 cm. × 4–5 mm., equal, glabrous but uneven with small irregular swellings, sordid-white marked with brownish stains on drying, hollow, cartilaginous, fragile, often splitting; flesh thin, pale-brownish, unchanging, taste and smell mild (normal agaric).

Described from specimens collected on the summit of the Coast Range, near Palo Alto, California, *Baker 86*. Related to *H. longipes* Peck, but larger, with ventricose gills and smaller spores.

6. **Drosophila ambigua** (Peck)

Hypholoma ambiguum Peck, Bull. Torrey Club **25**: 325. 1898.

Pileus thin, convex, becoming nearly plane, glabrous, subviscid when moist, straw color inclining to pale-orange, the mar-

gin in immature plants appendiculate with the remains of the white, thick veil which in very young plants conceals the lamellae, but which in mature ones wholly disappears; flesh white; lamellae close, adnexed, grayish at first, changing to dark-brown where wounded, becoming blackish-brown with age; stem slender, equal, stuffed or hollow, squamose near the base, paler than the pileus; spores ellipsoid, 12.5–15 × 7.5 μ.

Pileus 5–13 cm. broad; stem 12–22 cm. long.

Described from specimens collected by Lane in fir woods near Portland, Oregon, in November. The species belongs naturally in *Stropharia,* but the large veil is entirely appendiculate and leaves no annulus. It is one of the most striking and abundant gill-fungi on the Coast.

Seattle, Washington, *Murrill 245, 594, 649, Zeller 91;* Mill City, Oregon, *Murrill 868;* Corvallis, Oregon, *Murrill 929;* Salem, Oregon, *M. E. Peck;* Muir Woods, California, *Murrill 1131;* La Honda, California, *Murrill & Abrams 1272;* Searsville Lake, California, *McMurphy 92, 117.*

4. HYPHOLOMA (Fries) Quél. Champ. Jura Vosg. 112. 1872

Most of the collections cited under the two species listed below are without notes, and microscopic characters are of little assistance here. Persons using these specimens for comparison are therefore advised to do so with caution, depending rather upon fresh material and good descriptions.

1. HYPHOLOMA CAPNOIDES (Fries) Sacc. Syll. Fung. **5**: 1028. 1887

This species is rare on the Coast. It differs from *H. fasciculare* in having smoky-blue to purplish-brown gills and a mild taste. It is not credited with having cystidia, nor occurring on deciduous wood.

Seattle, Washington, *Murrill 473, 521, 687;* Salem, Oregon, *M. E. Peck;* Muir Woods, California, *Murrill 1128.*

2. HYPHOLOMA FASCICULARE (Huds.) Quél. Champ. Jura Vosg. 113. 1872

This species occurs in the greatest profusion on dead wood of all kinds. The gills are sulfur-yellow to greenish and at length purplish-brown with a greenish tint. The flesh is yellow and intensely bitter, according to descriptions. The spores are ellipsoid, smooth, pale-yellow, becoming purplish-brown, 6–7 × 4 μ, and cystidia are said to be present, measuring 40–50 × 10–12 μ.

Seattle, Washington, *Murrill 429, 501, Zeller 92;* Corvallis, Oregon, *Murrill 886;* Salem, Oregon, *M. E. Peck;* Golden Gate Park, San Francisco, California, *Miss Eastwood 14, 15;* Marin County, California, *Miss Eastwood 11;* Mt. Tamalpais, Marin County, California, *Miss Eastwood 33;* Berkeley, California, *Harper 20;* Sutro Woods, California, *Harper 59;* California, *Harper;* Searsville Lake, California, *McMurphy 32;* Stanford University, California, *McMurphy 155;* Monterey, California, *Dudley 125;* Santa Cruz, California, *G. J. Streator;* Santa Cruz Mountains, California, *Dudley 108.*

5. GOMPHIDIUS Fries, Gen. Hymen. 8. 1836

1. GOMPHIDIUS OREGONENSIS Peck, Bull. Torrey Club **25**: 326. 1898

Pileus at first convex, becoming nearly plane or somewhat centrally depressed, viscid, brown or dark-brown, becoming black in drying, taste sweet and pleasant; lamellae numerous, rather close, adnate or slightly decurrent, blackish in the dried plant; stem short, solid, equal or slightly tapering upward, colored like the pileus; spores oblong, 10–12.5 μ long, 4–5 μ broad.

Pileus 5–10 cm. broad; stem 2.5–5 cm. long, 4–10 mm. thick.

Described from specimens collected by Dr. H. Lane in fir woods in Oregon. According to Dr. Lane, it grows there by the wagon load and is edible. I found it common both in Washington and Oregon. Baker states that the gills are brightly phosphorescent. The spores are translucent with a blackish tint under a microscope and measure 11–13 × 3.5–4.5 μ, while in the very closely related *G. nigricans,* described by Peck from New York in 1896, the spores are 15–25 × 6–7.5 μ.

Seattle, Washington, *Murrill 255, 324, 500, 682;* Tacoma Prairies, Washington, *Murrill 706;* Corvallis, Oregon, *Murrill 968;* La Honda, California, *Murrill & Abrams 1242;* Stanford University, California, *Baker 155;* Santa Cruz, California, *G. J. Streator;* Berkeley, California, *Harper 22.*

2. GOMPHIDIUS VINICOLOR Peck, Ann. Rep. N. Y. State Mus. **51**: 291. 1898

Pileus thick, fleshy, convex or nearly plane, viscid, dark-red, becoming blackish in drying; lamellae distant, decurrent, olive-brown or blackish when mature, stem subequal, glabrous, solid, vinous-red, paler within; spores oblong-fusiform, 12–14×3.5–4 μ.

Pileus 2.5–6 cm. broad; stem 3–6 cm. long. 4–8 mm. thick.

Described from specimens collected under pine trees at Lake Mohonk, New York. The western plants are larger and have spores measuring about 17.5×5 μ. The spore print is olivaceous, while under a microscope the spores are translucent with olivaceous tints.

Stanford University, California, *McMurphy 111, Dudley 166;* Golden Gate Park, San Francisco, California, *Miss Eastwood 17, 20, Murrill 1107;* Berkeley, California, *W. C. Blasdale, M. A. Howe, Harper 54.*

3. **Gomphidius tomentosus** sp. nov.

Pileus convex to slightly depressed, gregarious to subcespitose, reaching 6 cm. broad; surface dry, conspicuously cottony-tomentose, ochraceous, discolored-ochraceous to avellaneous at the center, becoming yellowish-brown or pinkish-brown on drying, margin concolorous, incurved, conspicuously decorated with tomentum similar to that on the surface and also with a portion of the fibrillose veil; context ochraceous, becoming reddish-tinted on drying, sweetish to the taste, odor agreeable; lamellae decurrent, distant, inserted, forked at times, rather thick and entire on the edge; spores oblong-fusiform, smooth, translucent or opaque, olivaceous under a microscope, 17.5–21×7–9 μ; stipe similar to the pileus in color and tomentum, inclined to be fusiform in shape, solid, ochraceous within, 8 cm. long, 1.5 cm. thick, with a cushion of long, fibrillose-tomentose hairs, instead of the usual form of annulus.

Type collected on a mossy bank in low woods near Seattle, Washington, October 20–November 1, 1911, *W. A. Murrill 330.* Also collected at the same time by *S. M. Zeller 10,* and by an unknown collector in 1906 on clay soil near Seaside, Oregon. It is an anomalous species, not suggesting *Gomphidius* when first seen, but it has several characters in common with *G. vinicolor,* including the very characteristic spores.

NEW YORK BOTANICAL GARDEN.

TYPE STUDIES IN THE HYDNACEAE[1]
II. THE GENUS STECCHERINUM

HOWARD J. BANKER

The genus *Steccherinum* was established by S. F. Gray[2] on *Hydnum ochraceum* Pers. as the type. In Persoon's herbarium, now preserved in the University of Leyden, there is a specimen marked in what is believed to be Persoon's hand: "Hydnum ochraceum (junius? resupinatum) Prope Parisios." The specimen has been peeled from the substratum and glued tight to the sheet, hymenial surface down. It is nearly wholly resupinate, the margin being only slightly reflexed. In consistency of substance and character of teeth, so far as they could be made out, the specimen appeared to be identical with American plants commonly referred to this species.

As we have observed the plant in this country it presents a considerable degree of variation, from very thin sheets with slightly reflexed margins to much thicker layers with distinct prominent pilei. The typical form of the plant as suggested by Persoon's specimen and figure,[3] as well as by Sowerby's figure of *Hydnum Daviesii*,[4] believed to be a synonym, compared with our American plants most nearly like these, appears to be a thin, separable, membranous subiculum more or less reflexed at the margin into numerous thin flabelliform pilei. This typical form of the plant does not appear to be common with us and is usually found on the lower side of large prostrate limbs, spreading upward on the sides of the substratum until compelled to become reflexed to preserve the plagiotropic position of the hymenium. A more common form with us has a thicker subiculum and is usually found growing on the vertical side of standing trunks of various

[1] Investigation prosecuted with the aid of a grant from the Esther Herrman Research Fund of the New York Academy of Science.

[2] Nat. Arr. Brit. Pl. 1: 651. 1821.

[3] Persoon, Syn. Meth. Fung. *pl. 5. f. 5.*

[4] Sowerby, Eng. Fung. *pl. 15.*

deciduous trees, covering spots injured by fire or otherwise. The plant here grows spreading in a vertical position and forms numerous imbricated, campanulate, and often pendent pilei of considerable thickness. I have seen a quarter of an acre of young white oak twenty or twenty-five years old in which nearly every tree had a spot on one side near the ground and extending up the trunk for one or two feet bare of bark and covered with the sporophores of this plant. Whether the fungus had attacked the living tree and produced these decayed spots or whether the spots had been killed by other means and the fungus had taken possession could not be positively determined. But I think the latter was probably the case. It has seemed sometimes as though this form was a distinct species, but I have found fallen limbs of these same oaks on which the fungus developed too closely the characters of the typical *H. ochraceum* to warrant its being separated as a separate species.

Steccherinum dichroum (Pers.)

Hydnum dichroum Pers. Myc. Eur. **2**: 213. 1825.
Hydnum pudorinum Fries, Elench. **1**: 133. 1828.

The only specimen in Persoon's herbarium throwing any light on this species was one sent to Persoon by Delastre marked "hydnum rubiginosum Dre" and renamed in Persoon's hand "Hydnum dichroum." As Persoon cites Delastre for his specimen, it is probable that this is the type specimen. In consistency and character of teeth the plant closely resembles *Steccherinum ochraceum,* but differs in its thicker subiculum and more flabelliform pilei. The plant perhaps approaches too near *S. Rhois* (Schw.) to be regarded as a distinct species. There is, however, a fairly well defined group of forms intermediate between *S. ochraceum* and *S. Rhois,* of which this specimen appears to be typical and which may, therefore, be regarded as constituting the species *S. dichroum* (Pers.).

At Upsala, specimens of similar character were referred uniformly to *Hydnum pudorinum* Fr. From the late date of most of these specimens it is improbable that they were ever seen by E. Fries. A single specimen (of older date) was found, apparently received from Delastre and marked in Delastre's hand

"hydnum rubiginosum Dre. 1823,—Dichroum Pers. Myc. Eur. sect. 2 add[a] Pag. 213." Below this appeared in a different hand "pudorinum Fr." This plant differs considerably from the specimen in Persoon's herbarium, likewise received from Delastre, and approaches more nearly *S. ochraceum*. It is possibly the specimen to which Fries refers in "Hymenomycetes Europeae" 612. Fries himself regarded *Hydnum dichroum* Pers. as a synonym of his *H. pudorinum* and it seems best that the names should be regarded as synonyms, but the older name of Persoon has priority and the species should be known as *Steccherinum dichroum* (Pers.).

STECCHERINUM RHOIS (Schw.) Banker, Mem. Torrey Club **12**: 126. 1906

Hydnum Rhois Schw. Syn. Fung. Car. Sup. 77. 1818.
Hydnum flabelliforme Berk. Lond. Jour. Bot. **4**: 306. 1845.

The type of *H. Rhois* Schw. in the Schweinitz herbarium at Philadelphia has disappeared. In the Berkeley herbarium at Kew, England, a specimen was found marked "Hydnum Rhois L. v S. Herb. Schwein." and is presumably a part of the original Schweinitz specimen. This particular specimen is somewhat smaller than the type of *Hydnum flabelliforme* Berk. preserved in the same herbarium and approaches somewhat closely to *Steccherinum dichroum* (Pers.), but in most of its characters is essentially the same as *Hydnum flabelliforme* Berk. Comparison with extensive collections of our American forms convinces me that *H. Rhois* cannot be successfully separated from *H. flabelliforme*.

The entire series of forms included under these three species, *Steccherinum ochraceum* (Pers.), *S. dichroum* (Pers.), and *S. Rhois* (Schw.), constitute a closely continuous series in which over refinement of species making might be able to segregate some five or six more or less clearly defined forms. We believe, however, that the three species enumerated is as close a segregation as the group will bear and it may even be reasonably questioned whether these species are anything more than extreme variations of a single fundamental type. It seems to be possible to obtain an almost complete blending of the species by intermediate forms, some of which perhaps are really represented by

the synonyms. Thus *H. pudorinum* Fr. might be regarded as a form intermediate between *H. ochraceum* Pers. and *H. dichroum* Pers., while *H. Rhois* Schw. strictly interpreted is perhaps intermediate between *H. dichroum* Pers. and *H. flabelliforme* Berk.

Steccherinum rawakense (Pers.)

Hydnum rawakense Pers. Freyc. Voy. Aut. du Monf. Bot. 175. 1826.
Hydnum reniforme Berk. & Curt. Jour. Linn. Soc. **10**: 325. 1869.
Hydnum glabrescens Berk. & Rav. Grev. **1**: 97. 1873.
Hydnum guaraniticum Speg. Fung. Guar. 34. 1883.
Hydnum basi-asperatum Henn. Hedw. **36**: 199. 1897.

No type of *H. rawakense* Pers. was found in Persoon's herbarium at Leyden, but in the Herbarium of Paris there was found a specimen with the following label apparently in Persoon's hand; "37 hydnum rawakense Rawak. C. Sandrenaud," and then there was added in a different hand "spec. Persoonianum." The specimen would appear to be in all probability the type of the species. It is discolored as though it had some time been poisoned, and has evidently been formerly glued to a sheet teeth down, the teeth being gummed up with the glue.[5] In spite of these deformities, there appears to be but one group of forms to which it could belong, a species that ranges from the West Indies through South America and the islands of the Southern Pacific. The most distinctive features of the species are the thin, submembranous, spreading pilei, the pubescent, ochraceous surface with a somewhat clearly marked central or basal disk and a broad marginal portion marked with more or less distinct light and dark zones. At Berlin specimens of this species were noted from Brazil and from New Guinea, the latter having the margin distinctly lobed.

The type of *H. reniforme* B. & C. is in the Berkeley herbarium at Kew and is marked "301 Hydnum reniforme Bk. Cuba, Wright, (Curtis)." It appears to be unquestionably the same thing as *H. rawakense* Pers. The specimen at Kew, "Ravenel No. 1634," the type of *H. glabrescens,* appears to me to be prob-

[5] In Persoon's herbarium several specimens were observed mounted in this unusual manner. See *S. ochraceum.*

ably this same species, but is not quite typical, having a thicker pileus, and is a little darker colored.

At Paris a specimen was found evidently distributed by Spegazzini as an authentic specimen of his *H. guaraniticum* from Paraguay, June, 1883. The plant appeared to have all the characters of *H. rawakense* Pers.

The type of *H. basi-asperatum* Henn. is in the Berlin herbarium, Germany, and was collected by E. Ule in Brazil, No. 743. The plant has precisely the texture, color, and tooth characters of *Steccherinum rawakense* Pers. It appears to have been a plant that when half grown had been turned over so as to bring the hymenial side upward and had then proliferated a series of confluent pilei from its margin, giving the margin a lobed appearance. The hymenial layer of these new growths has spread back over what was the upper surface of the old pileus, forming a continuous layer which is interrupted, however, at one point where the characters of the upper surface of the old pileus are revealed. The teeth on the old lower surface now exposed upward have become darkened and appear weathered somewhat, but are still distinctly teeth and not hairs or tomentum. With this explanation the plant is identical with Moller's specimens in the same herbarium mentioned by Hennings in his original description. This curious mare's-nest is figured true to the specimen in Engler und Prantle, Die naturl. Pflanzenf. I. 1**: 145. *f.* 77. *c–e*.

Steccherinum pusillum (Brot.)

Hydnum pusillum Brot. Fl. Lus. **2**: 470. 1804.

Steccherinum adustulum Banker, Mem. Torrey Club **12**: 133. 1906.

The type of *H. pusillum* Brot. is probably not in existence. At both Kew and Upsala were found specimens from Quélet referred in some cases to *Hydnum pusillum* Fr., in others to *H. pusillum* Quél. and at Upsala the sheet itself was marked "Hydnum pusillum Brot." All of these specimens were undoubtedly the same as my *Steccherinum adustulum*. The species is, therefore, a European form as well as American, and Brotero's description so well fits the characters of the plant as we know it that there seems to be no reasonable doubt that his name should prevail for this species.

Steccherinum Peckii sp. nov.

Hymenophore pileate narrowing into a lateral stipe; pileus flabelliform, horizontal, confluent laterally, 0.5–1 cm. wide, by confluence often 3 cm. wide, 0.5–1.5 cm. long, thin, less than 1 mm. thick; surface glabrous or slightly puberulent, radiately rugose, subsulcate-zonate, light-buff, concentrically zonate with fine dark lines; margin thin, subrepand; substance fibrous, dry, brittle; stipe lateral, more or less compressed vertically, attenuate to base, usually distinct, occasionally confluent, concolorous with pileus, 1–8 mm. long by 1–5 mm. wide; hymenium ochraceous, more or less sharply delimited toward the stipe; teeth crowded, short, often decurrent as papillae on the stipe, ochraceous to buff, terete to compressed, sometimes forked, whitish-puberulent with free clavate hyphal ends, 1–2 mm. long, 9–12 to a sq. mm.; spores elliptical or oblong, smooth, hyaline, granular, 2–2.5 × 3–3.5 μ; hyphae hyaline, firm-walled, elastic, compactly woven, infrequently septate; tasteless; odorless.

On dead maple limbs in autumn at Griffin's Corners, Delaware County, N. Y. Collected by C. H. Peck.

Type in the writer's herbarium and in the New York State herbarium at Albany, N. Y.

This elegant species is closely related to *Steccherinum Rhois* (Schw.), from which it is clearly distinguished by the nearly or quite glabrous surface of the pileus and by the sharply defined, concentric, dark lines. The surface has a somewhat silky lustre and this with the color markings and the graceful, clearly defined form of the pileus renders the species especially attractive. I take pleasure in dedicating this handsome species to the collector, our mycological Nestor, Dr. C. H. Peck, State Botanist of New York.

Steccherinum basi-badium sp. nov.

Hymenophore pileate, sessile to substipitate, somewhat confluent; pileus dimidiate to orbicular, horizontal or ascending, 0.5–1.5 cm. wide, 0.5–1 cm. long, 0.2–0.3 mm. thick; surface sulcate-zonate, radiately subrugose, glabrous, light-buff at margin, becoming abruptly darker, umbrinous to badious toward base; margin very thin, acute, substerile, incurved; substance fibrous, dry, scarcely brittle, buff to ochraceous below, badious above; teeth crowded, delicate, slender, subterete to compressed, tips minutely forked or fimbriate, 0.3–0.5 mm. long × 0.1 mm. wide, pale-buff to ochraceous, puberulent with free clavate hyphal ends; spores not

observed; hyphae hyaline, firm-walled, elastic, infrequently septate, clamp-connections occasional, not easily separable in KOH; tasteless; odorless.

Mexico. Collected by W. A. Murrill.

Type (Murrill 253) in the New York Botanical Garden.

The species appears to be closely related to *Hydnum rawakense* Pers. and *S. Peckii,* but is more delicate, with a thinner pileus, and is clearly distinguished by the dark brown disk and base.

STECCHERINUM MORGANI Banker, Mem. Torrey Club **12**: 127. 1906

As has already been stated, the type of *Hydnum glabrescens* Berk. & Rav. is No. 1634 Ravenel, with which Berkeley also associated No. 385 Thwaites. These specimens are preserved in the Berkeley herbarium at Kew, England. No. 1634 has every appearance of being *Steccherinum rawakense* (Pers.), q. v., but is not quite typical. No. 385 is simply marked "385 Hydnum glabrescens B. & Rav." and is without any date or locality indicated. The specimen is badly worm-eaten and a mere scrap, but does not appear much like No. 1634. It does resemble another specimen in the herbarium marked "Hydnum glabrescens B. & R." in Berkeley's hand. To this specimen is attached a slip with the following memorandum: "A form apparently of no. 385 sent before. Hydnum Central Province Dec. 1868," probably a note by Thwaites. This specimen is also in poor condition. A third specimen with these has no name attached, but is marked "Ceylon 1866 G. H. K. T." This specimen is in much better condition than the others and strikingly resembles the plants that I described as *Steccherinum Morgani loc. cit.* from specimens collected by A. P. Morgan in Ohio.

These three specimens so far as can be judged are apparently all one species and were probably all collected by Thwaites in Ceylon. On the testimony chiefly of the last specimen they seem to approach closely to the Morgan plants, yet the specimens were too poor to draw positive conclusions. In the Cooke Herbarium, also now preserved at Kew, was found a specimen marked simply "Hyd. glabrescens B. & R. Ceylon." This was so perfectly identical with the Morgan plants in every way that it seemed not

only that it was the same species but must have been collected under precisely the same conditions, in fact, it appeared to be part of the same collection. It seemed impossible that plants not known to be cosmopolitan could have developed in regions so remote and of so different environmental conditions as in Ceylon and Ohio and have produced such perfect identity of characters. Two plants could not possibly be any more perfectly alike. Knowing that Cooke had received some of Morgan's specimens, it seemed too probable that there had been an error in labeling and that the specimen should have been marked Ohio instead of Ceylon. Later, however, at South Kensington in the Broome Herbarium there was found a specimen just as perfectly identical with the Morgan specimens as was the Cooke specimen and this was marked "Hydnum Ceylon. G. H. T. 1854." There appeared to be no reason to doubt that this was truly a Ceylon plant and hence that the Cooke specimen was also correctly labeled. It seems, therefore, conclusively demonstrated that plants identical in every respect with the type of *Steccherinum Morgani* were collected in Ceylon by G. H. K. Thwaites between 1854 and 1868, and that No. 385 is in all probability one of these plants.

The South Carolina plant of Ravenel, No. 1634, does not belong to this species. It is also evident that Berkeley had the Ravenel plant in mind as the type of his *H. glabrescens* not only from the fact of his having described the species in a work on North American fungi, but also from the fact that when he placed any name on the Ceylon plants it was with the ascription "B. & Rav." or "B. & R." It seems clear, therefore, that the name was first given to the American plant and the Ceylon specimens were then referred to this species, as we believe, erroneously.

Steccherinum laeticolor (Berk. & Curt.)

Hydnum laeticolor Berk. & Curt. Grev. **1**: 99. 1873.

The type of this species according to the citation of Berkeley is Curtis 2930, with which are associated other specimens from the South, as Beaumont 4647, 5166, and Ravenel 894. These specimens are all in the Berkeley Herbarium at Kew. The species as thus represented is a clearly defined segregation some-

what resembling *Steccherinum ochraceum* (Pers.) in general appearance, but readily distinguished by its soft spongy or almost cotton-like substance and its pronounced reddish color when young and fresh, but this color fades out considerably with age and weathering. There seems to have been no confusion respecting the species and it is correctly represented in the Exsiccati of Ravenel, Fung. Car. Exsicc. **3**: 18; and Ellis and Everhart, N. Am. Fung. 2nd Series, 2015. The species appears to be confined wholly to the southern states.

Steccherinum multifidum (Kl.)

Thelephora multifida Kl. Linnaea **25**: 365. 1852.
Hydnum plumarium Berk. & Curt. Jour. Linn. Soc. **10**: 324. 1869. Not *H. plumarium* Berk. & Curt. Grev. **1**: 97. 1873.

There is reason for some doubt as to whether this species should be included in the genus *Steccherinum* or not. It does not appear to have closer affinities with any other genus and if removed would have to be erected into a genus by itself. The principal departure from the generic type is in the character of the hymenial surface, which consists of poorly developed but closely anastomosing ridges more or less cut up into flattened, conical, or cylindrical teeth. In this respect the plant shows some affinity to the genus *Phlebia* and in places the anastomosation becomes so close as to form alveolar pores, suggesting a close relationship to *Favolus* of the Polyporaceae.

The type of *Thelephora multifida* Kl. is preserved in the Berlin herbarium and is marked "No. 14c. Thelephora (Merisma) multifida Kl. Portorico. Schwanecke." The specimen has the hymenial ridges and teeth so more than usually poorly developed as to be scarcely noticeable, hence the plant was referred to *Thelephora*. The teeth, however, are present in places, and Hennings recognizing them referred the specimen to *Hydnum*.

The type of *Hydnum plumarium* B. & C., Jour. Linn. Soc. **10**: 324, is given by Berkeley as "205" Cuban Fungi. In the Berkeley herbarium at Kew, the specimen is marked "205 Hydnum plumosum B. & C., Cuba, Wright (Curtis)." It is an excellent specimen of the same species as *Thelephora multifida* Kl. It is entirely distinct from *Hydnum plumarium* B. & C., Grev. **1**:

97, as may be determined by comparison of the descriptions, and is confirmed by the types at Kew.

The study of numerous specimens of *Steccherinum multifidum* (Kl.) at Berlin, Kew, New York Botanical Garden, and in the writer's herbarium show the plant to vary considerably in the degree of development of the hymenial ridges and teeth, and always there is more or less interruption in the extent of these features, so that many parts of the hymenial surface appear nearly smooth. The margin of the pileus also varies greatly from barely fimbriate to deeply laciniate.

The plant appears to be of fairly common occurrence but is confined to the region of the West Indies.

DOUBTFUL SPECIES

HYDNUM DECURRENS B. & C., according to Berkeley, is based on plants collected by Wright in Cuba and sent to Berkeley by Curtis, Nos. 234 and 297. The specimens are at Kew and No. 234 is a fragment of little value. No. 297 is a good complete specimen identical in every respect with specimens distributed in "Fungi Cubenses Wrightiani," No. 346, as "Hydnum decurrens." The plants appear to be too near *Steccherinum ochraceum* (Pers.).

HYDNUM PLUMARIUM Berk. & Curt. Grev. **1**: 97. 1873. Not *H. plumarium* Berk. & Curt., Jour. Linn. Soc. **10**: 324. 1869. The type according to the citations of Berkeley is "4936 Car. Sup." The specimen at Kew marked "4936 *Hydnum plumarium* B. & C. Car. Sup. on Viburnum" appears to be a pale, perhaps weathered, specimen of *Steccherinum laeticolor* B. & C., but the material is too scanty to be of much value.

HYDNUM CONCHIFORME Sacc. Syll. Fung. **6**: 458. 1888, was proposed as a substitute for *Hydnum plumarium* B. & C. above and hence is based on the same material as type.

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ACHLYA DeBARYANA HUMPHREY AND THE PROLIFERA GROUP

W. C. Coker

(With Plate 78, Containing 13 Figures)

Achlya DeBaryana Humphrey is the *Achlya polyandra* of DeBary, *not* of Hildebrand, as Humphrey has shown;[1] and as Hildebrand's name is the older and applies to another plant, Humphrey's name should be used. Recent writers on the morphology of this species have ignored this and still call the plant *Achlya polyandra* DeBary. There are now recognized three very closely related species, forming what was called by Humphrey the *prolifera* group, which from the work of recent writers are becoming more and more difficult to separate. They are *Achlya prolifera* (Nees) DeBary, *A. DeBaryana* Humphrey, and *A. americana* Humphrey. Humphrey was himself aware of the very close resemblances of these species and remarked upon it; but on account of DeBary's assurance of the autonomy of the first two, felt called on to continue the distinction. According to DeBary,[2] *A. DeBaryana* (his *A. polyandra*) has antheridial branches that arise from the same main hyphae that bear the oögonia, and then branch and extend out to the oögonia on the branches from which they arose (which is most common) or to oögonia on other threads. In *A. prolifera,* on the other hand, he says that the antheridial branches are diclinous, always arising from other hyphae than the ones that bear the oögonia and that all oögonia are furnished with antheridia. He also says that while *A. prolifera* has oögonia with abundant pits, the oögonia of *A. DeBaryana* is without them. *Achlya americana* has antheridial branches that arise from the same hyphae as the oögonia, and it also has

[1] The Saprolegniaceae of the United States. Trans. Amer. Philos. Soc. 17: 1892.

[2] Untersuchungen über Peronosporeen und Saprolegnieen. Beitr. zur Morph. und Phys. der Pilze, IV Reihe. 1881.

abundantly pitted walls; thus uniting the characters of *A. prolifera* and *A. DeBaryana*.

From the work of Horn,[3] Peterson,[4] and myself it has now become evident that it is no longer possible to distinguish clearly between these species as established by DeBary and Humphrey. Forms are appearing constantly that combine their qualities in so confusing a manner that it is impossible to refer them with certainty. For example, Horn says (l. c., p. 224) that while the plant he describes is undoubtedly near *A. DeBaryana* (*A. polyandra* as he calls it), it cannot with absolute certainty be said to be identical with it; for while in *A. DeBaryana* the antheridia are mostly of androgynous origin, in his plant they are mostly diclinous. He also finds that when cultivated in peptone and in grape sugar or cane sugar certain oögonia show numerous pits.

In his work on Danish Fresh-water Phycomycetes, Peterson (l. c., p. 524) finds, of these three species, only *A. americana*. He places it as a form of *A. DeBaryana* (*A. polyandra*, as he calls it) not as a species, saying that "The reason I do not make use of Humphrey's species-name, but place this species as a variety of *Achlya polyandra* is that I am inclined to regard these pores as variable characters, as there are always some oögonia which have fewer pores than others."

Neither *Achlya prolifera* nor *A. DeBaryana* has so far been described from America. A form that is one or the other or both of these has appeared in my cultures at Chapel Hill for a number of years. It is by far the most abundant *Achlya* in our territory and may be had from springs, ditches and pools at any time of the year. During the spring and summer of this year (1912) I carefully studied the plant in pure cultures from a number of different collections.

To the naked eye, the species may be easily distinguished from others by the very large chlamydospores that usually make a white fringe at the periphery of the cultures. These are often arranged into groups that resemble the branching horns of a deer (fig. 1), or they may be shaped more like a section of *Halameda* (fig. 2). In mature cultures the hyphae become divided up

[3] Annales Mycologici **2**: 207. 1904.
[4] Annales Mycologici **8**: 294. 1910.

into sections containing dense protoplasm, each section being a chlamydospore. As with other chlamydospores, these will later either become sporangia or give off slender hyphae, sometimes many of them. Sometimes in their formation chlamydospores begin to break apart by bending backward as shown by the apical one in fig. 1. They rarely become entirely detached. The sporangia vary a great deal both in size and shape. At one extreme are those that are large and stout and rounded at the end, as in figs. 3 and 4, and at the other are long, slender forms that are drawn out to a narrow point, which is often bent, as in figs. 5 and 6.

In typical cases the spores on escaping act as usual in species of *Achlya,* forming a rather perfect sphere at the tip of the sporangium. Through long observation, however, cases have not rarely been seen where the spores fell apart to a greater or less degree, with the resultant formation of a community of detached groups, as shown in fig. 6. It is this variation from the usual course that led, fortunately, to the settlement of the uncertainty that has existed until now as to the presence or absence of a gelatinous matrix in the sporangium that is instrumental in causing the expulsion of the spores. I had long ago convinced myself of the existence of such a substance from the behavior of the spores in emerging in species of *Achlya* under usual and unusual conditions. The formation of a little emergence-papilla just before the escape, the rapidity and violence of the escape when followed by immediate quiescence (the sudden popping of a spore under constriction through a smaller opening would seem impossible under its own steam) and the frequent retention of some of the last spores in the sporangium are all strong evidence of mechanical propulsion under inside tension. And the presence of cilia on the escaping spores (a point that is still in dispute[5]) could scarcely modify the force of the evidence. The actual proof, however, of the presence of such a jelly was still lacking until presented under the conditions shown in fig. 6. If such a brotherhood of newly-emerged spores be disturbed, the *whole archipelago will move as a unit,* showing beyond a doubt that they are all bound together by a jelly that surrounds them. And it is the

[5] See Horn, L. C., p. 221.

swelling of this jelly that ejects the spores from the sporangium.[6]

Very often the spores do not come out, but either emerge through short individual tubes as in *Dictyuchus,* or sprout at once into hyphae as in *Aplanes.*[7] In fig. 7 the spores are emerging simply through holes; in fig. 8 they are escaping through tubes of considerable length. Some were seen in the act of escaping in both of these cases.[8] The passage of the protaplasm through the opening is at first very slow, but when about half way through the flow becomes much more rapid and the escape quickly follows. When free the spore scarcely shows any motion for several minutes, only a barely perceptible and uncertain rocking. Soon the motion becomes more active and in about five or ten minutes, depending on the temperature, the spore swims briskly away. In the case shown in fig. 7, the spores before emergence contained a good-sized vacuole. At the moment of complete emergence this vacuole became suddenly much smaller, probably by contracting and discharging as in the case of *Amoeba.* This was clearly discerned a number of times under the high power. The little depauperate sporangia shown in figs. 7 and 8 were formed immediately from spores sprouting in a large sporangium. When a small insect was placed near them, the end cell was sent out as a long and very delicate hypha that reached the insect and penetrated it. The spores in the sporangia were in a resting condition, but when deprived of air by being covered with a glass for a while, the spores began to emerge as shown. By this method sporangia of *Dictyuchus* and other species that have been resting for some time may be made to empty themselves whenever desired, as I have repeatedly demonstrated.

The oögonia are racemosely borne on straight or bent branches that vary greatly in length. Sometimes they are not one half as long as the diameter of the oögonia; again they may be four times as long. These extremes in length are rare and they usually vary from about one and one half to two and one half times the

[6] For Humphrey's argument against the mechanical expulsion of the spores in *Achlya,* see his Saprolegniaceae of the United States, page 66.

[7] Such variations occur in most of the species of Saprolegniaceae that I have studied. See Lechmere. The New Phytologist **9**: 308. 1910; and **10**: 167. 1911.

[8] This phenomenon was also observed for this species by Ward. See Quart. Journ. Micro. Scien. **23** N–S: *272.* 1883.

diameter of the oögonia. The walls of the oögonia are generally quite round and smooth, but at times they are furnished with low rounded projections at the pits, which are scarcely larger than to make the oögonia appear angular in section (fig. 9). In the walls of many oögonia pits are obviously present at pretty regular distances (fig. 10), but in many others the wall appears to be free of pits except that it is thin over the whole extent that is covered by the antheridia (fig. 11). Intercalary oögonia appear occasionally as shown in fig. 12. The oöspores are eccentric and are very variable in number. Two, four, and six are common numbers, one and eight are not rare, but more than eight are not often seen.

The antheridial branches arise from the same main hyphae as the oögonial branches. They usually extend for a considerable distance, branching either extensively or sparingly, and attach themselves to any oögonia they may meet, whether from their own main hyphae or from others. However, they seem to show some preference for the oögonia of other hyphae, and the antheridia on an oögonium are more apt to be of diclinous than of androgynous origin. This agrees with what Horn found in his plants, as mentioned above, and is contrary to DeBary's observations on his *Achlya polyandra* (*A. DeBaryana* Humphrey). In fig. 13 is shown an antheridial branch which has arisen by the proliferation of a halted oögonial initial, thus showing the essential homologies of the two sorts of organs. This branch has furnished antheridia for two oögonia of the same origin as itself. Not all oögonia are furnished with antheridia, the number without them varying from a small to a rather large proportion in different cultures.

It is now evident that our Chapel Hill form cannot certainly be referred to any described species of the *prolifera* group. If we compare their characters it would seem that our plant is somewhat nearer *A. prolifera* than it is to the others, as the antheridia are most often of diclinous origin, and the oögonia are generally pitted. But as *A. prolifera*, according to DeBary, does not have antheridia and oögonia on the same main hypha, that species is excluded here. And *A. DeBaryana* as described by DeBary (as *A. polyandra*) is equally excluded by its lack of oögonial pits and

the generally androgynous origin of its antheridia. However, from the figures of DeBary and Horn of *A. polyandra* DeBary (*A. DeBaryana* Humphrey), our plant seems really to be very near that species; and it seems best, at present, to extend somewhat the limits of *A. DeBaryana* so as to include Horn's form and our Chapel Hill plant.

Meanwhile, if *Achlya prolifera* can be found again, it should be carefully studied and the limits of its variation determined. If the other two are not distinct from it, then its name must be extended to all of them.

CHAPEL HILL, NORTH CAROLINA.

EXPLANATION OF PLATE LXXVIII

Fig. 1. A typical group of chlamydospores. × 75.

Fig. 2. Chlamydospores of another form. × 75.

Fig. 3. Several sporangia of the short, thick type. × 75.

Fig. 4. A sporangium opening by two tubes. × 75.

Fig. 5. Sporangia of a longer and narrower type. × 75.

Fig. 6. A sporangium like the above. The spores scattered somewhat on emerging. × 75.

Fig. 7. Depauperate sporangia formed from filaments sprouting directly from the spores in a large sporangium. Spores emerging from one filament. × 335.

Fig. 8. A sporangium similar to the above. × 335.

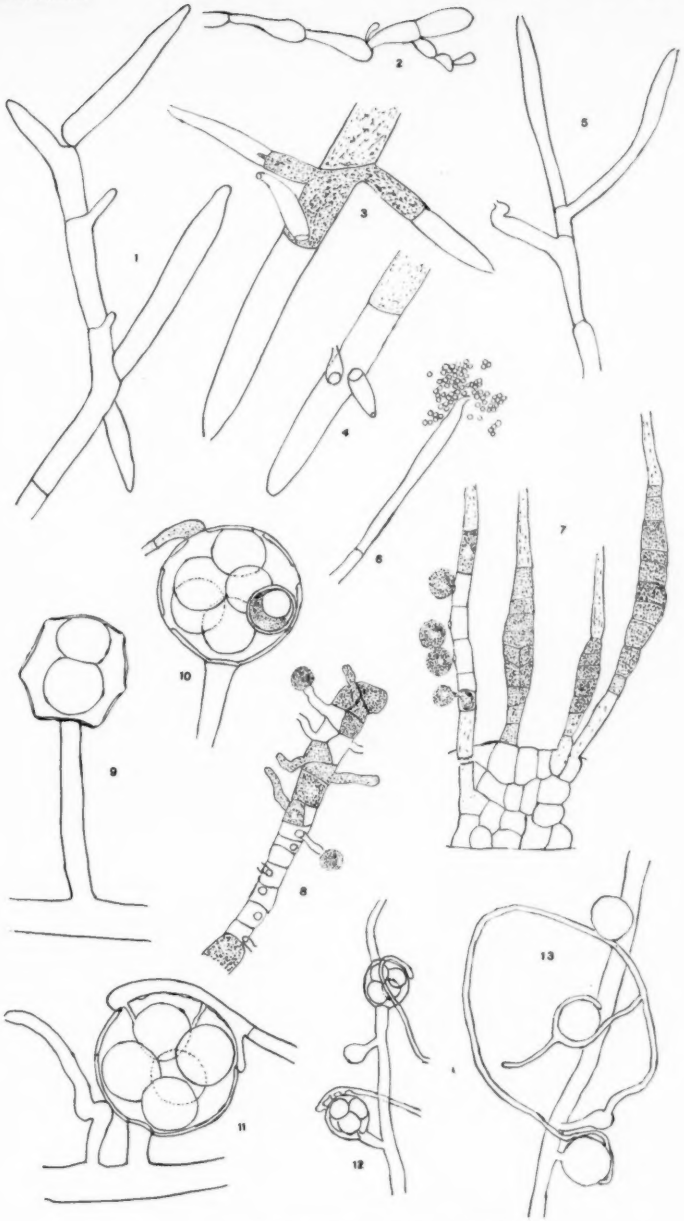
Fig. 9. An angular oögonium showing pits. × 335.

Fig. 10. A typical oögonium with pits; an antheridium attached; the contents of one egg filled in. × 335.

Fig. 11. An oögonium without pits except for the thin area where the antheridium is attached. Two antheridial tubes shown. × 335.

Fig. 12. Two oögonia, one intercalary, with diclinous antheridia. × 125.

Fig. 13. Three oögonia, with antheridial filament of androgynous origin × 125.



ACHLYA DEBARYANA HUMPHREY

ACHLYA GLOMERATA sp. nov.

W. C. Coker

(With Plate 79, Containing 7 Figures)

Hyphae rather stout, branched, not long. About 40–45 mu in diameter at base and tapering to slender tips about 12 mu in diameter at base and tapering to slender tips about 12 mu in diameter. At maturity, the main hyphae strongly incline to segment into elongated sections with dense protoplasm, but the slender apical section is apt to remain almost empty (fig. 1). Zoösporangia almost cylindrical, inclined to be somewhat irregular and often opening by a bent papilla (fig. 2). Oögonia abundant, approximately spherical, without pits; completely covered with short, blunt irregular warts (fig. 3). Oögonia borne on the tips of very slender and delicate, but contorted lateral branches that are either simple, in which case there is but one oögonium (fig. 3), or more or less intricately branched, in which case there are a number of oögonia borne on the tips of the group of branches (figs. 4, 5, and 6). Oöspores single or very rarely two in an oögonium; their diameter 15–23 mu, averaging about 20 mu. Antheridia absent from a good many oögonia, when present, club-shaped; borne on the tips of branches from the same glomerulus and one or several on an oögonium (fig. 5).

This species has been observed several times from two stations at Chapel Hill, North Carolina. The drawings are made from material taken from a cool spring in dense woods ("Lone Pine Spring") on April 30, 1912, and from the springy marsh at the foot of "Lone Pine Hill" on February 29, 1912. Pure cultures have now been kept for about six months.

This species does not closely approach any other; but it seems to be nearest the members of the *racemosa* group. The shape of the antheridia is like those of *A. racemosa* and its relatives, and there is considerable resemblance to the spiny oögonia of *A. racemosa stelligera* and to *A. decorata,* if these two are really distinct.[1] There is also some hint of the habit of *A. glomerata* in the occasional branched oögonial threads of *A. decorata.* In all the

[1] Obel considers *A. decorata* Peterson the same as *A. racemosa* var. *spinosa* Cornu (Annales Mycologici **8**: 422. 1910): and Humphrey gives the latter as a synonym of *A. racemosa* var. *stelligera* Cornu.

members of the *racemosa* group the antheridial branches, when present, originate just below the oögonium. In *A. glomerata* they do not thus originate. This distinction with the usually bent and twisted branching habit of the oögonial hyphae separates the species sharply from any of the *racemosa* group. As already mentioned, the oögonia are sometimes borne singly on the ends of simple branches, especially near the tips of the main hyphae, but in such cases these branches are much more delicate and longer in proportion to the oögonia than is generally the case in any member of the *racemosa* group.

The fruiting branches are so abundant and many of them are so elongated and extensively branched that the cultures take on a whitish, cottony appearance except near the periphery, which is usually without branches. In extreme cases this effect is so pronounced that the culture may be compared in appearance to a rug with a fringe. This reminds us of the " woolly snow-white turf " produced by deBary's *Achlya spinosa*,[2] which species, while not in the close family circle of the *racemosa* group, shows its relation to them by its spiny oögonia with generally one egg, and by the origin and shape of the antheridia.

So far as the sexual organs are concerned, there is a remarkably close resemblance between *Achlya glomerata* and *Saprolegnia asterophora* deBary.[3] As in most species of *Achlya*, the spores sometimes remain in the sporangium and sprout there (fig. 7).[4]

CHAPEL HILL, NORTH CAROLINA.

EXPLANATION OF PLATE LXXIX

Fig. 1. Part of filament from an old culture, showing segmentation into chlamydospores. Part of one long cell is omitted. The contorted tip cell is almost empty. × 185.

Fig. 2. A group of sporangia in different stages. × 125.

Fig. 3. A simple oögonial filament with one oögonium. × 335.

Fig. 4. A branched oögonial filament with two oögonia. × 335.

Fig. 5. A more complex group of oögonia, not all shown. One is intercalary. × 335.

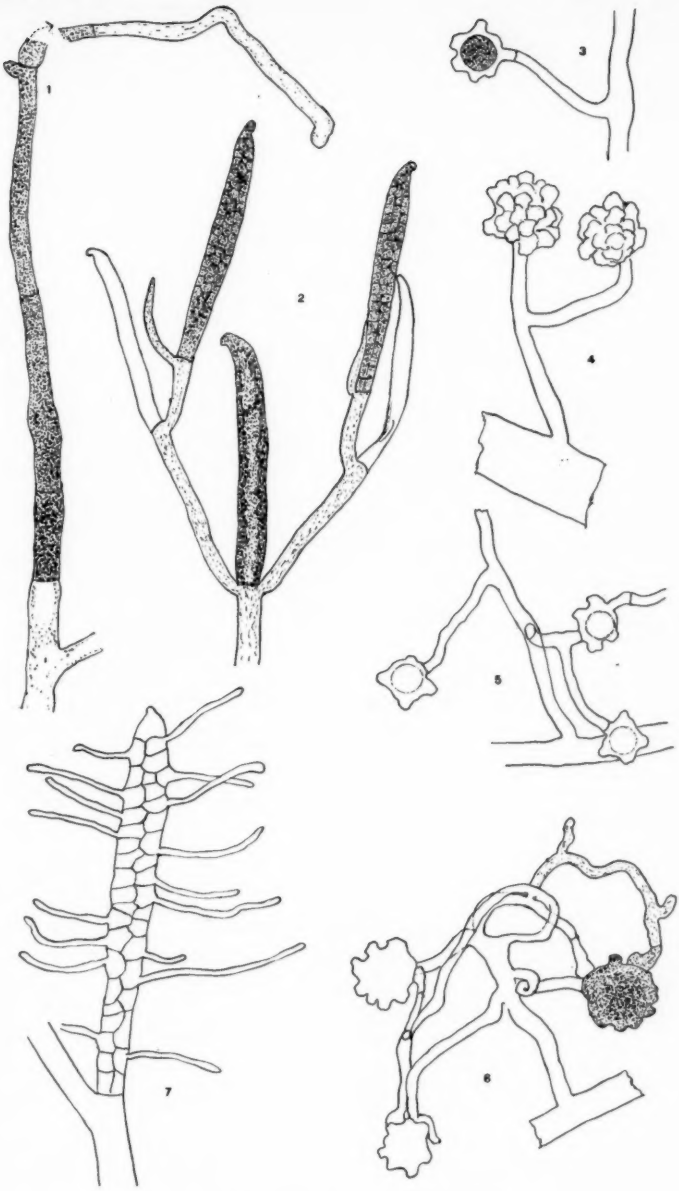
Fig. 6. A characteristic group of oögonia with antheridia. The protoplasmic contents are shown only in part. × 335.

Fig. 7. A sporangium in which the spores became encysted and sprouted in position. × 335.

[2] Botanische Zeitung **46**: 647. 1888.

[3] See Beitr. zur Morph. und Phys. der Pilze, IV. Reihe, 1881.

[4] See article by the author in Bot. Gaz. **50**: 381. 1910.



ACHLYA GLOMERATA COKER

NEWS AND NOTES

The first Mexican Scientific Congress will be held in the City of Mexico on December 9 to 14.

Mr. G. F. Gravatt has been appointed pathologist in charge of the chestnut canker investigations in Virginia, which will include first of all a survey of the state to locate the infected areas.

The proceedings of the Pennsylvania Chestnut Blight Conference, held at Harrisburg, February 20 and 21, 1912, have been recently printed in full in a very attractive and well illustrated volume of 253 pages.

Professor W. J. Wright, formerly of the department of horticulture of the Pennsylvania State College, has resigned to accept the directorship of the New York State School of Agriculture at Alfred University, Alfred, New York.

According to the observations of C. Wehmer (Ber. Deutsch. Bot. Gesell. **29**: 704–708), oak wood is much more highly resistant than pine to the attacks of dry rot (*Merulius lacrymans*), although easily invaded by many other fungi.

An important illustrated paper on the fungous flora of arable soils, by Dr. C. N. Jensen, has recently appeared as Bulletin 315 of the Cornell University Agricultural Experiment Station. It contains a few new species and many interesting observations.

Mr. L. O. Overholts, of the department of botany of Miami University, Oxford, Ohio, was granted a research scholarship at the Garden during August and September. He devoted his attention to the completion of a list of the Polyporaceae of Ohio, with full keys to the genera and species.

Porfessor W. G. Stover, of the Oklahoma Agricultural Experiment Station, has been appointed assistant professor of botany in Ohio State University for the coming year. Mr. Stover is a graduate of Miami University and was at one time a student at the Garden.

Mr. P. J. Anderson, field pathologist of the Pennsylvania Chestnut Tree Blight Commission, and Professor H. W. Anderson, investigator for this Commission, visited the Garden August 14 to examine herbarium specimens and literature of fungi relating to the chestnut blight.

Bulletin 255 of the Bureau of Plant Industry at Washington, by Dr. E. F. Smith and Assistants, contains numerous illustrations showing the effects of crown gall on plant tissues, with a brief discussion of the disease and the results of investigations on the subject.

The entire herbarium of the late Professor Alfred James McClatchie, of Throop Polytechnic Institute, Pasadena, California, has recently been purchased by the New York Botanical Garden. It contains 1,835 specimens of fungi, many of which are valuable types.

Dr. F. D. Heald, formerly professor of botany in the University of Texas, is now an investigator under the Commission for the Investigation and Control of the Chestnut Tree Blight Disease in Pennsylvania, with his headquarters at the Zoology Building, University of Pennsylvania, Philadelphia.

Dr. A. F. Blakeslee has a year's leave of absence from the Connecticut Agricultural College. He has a temporary appointment on the staff of the Carnegie Station for Experimental Evolution at Cold Spring Harbor, Long Island, New York, where he will spend the year in research work on the lower fungi.

Dr. P. Baccarini has studied the effects of *Daedalea unicolor* on living trees of *Acer rubrum* in the botanical garden at Flor-

ence, and believes that the trees are gradually killed by this fungus, which causes a special decay of the wood, transforming it into a white, fibrous, very fragile mass.

Professor Bruce Fink, of Miami University, Oxford, Ohio, desires to see fresh material in abundance of species of the Collemaceae collected in various parts of North America. This group of lichens is greatly in need of careful modern taxonomic treatment and Professor Fink will devote much of his time to it during the next two years.

Bulletin 247 of the Bureau of Plant Industry at Washington is devoted to the discussion of a knot of citrus trees caused by *Sphaeropsis tumefaciens,* by Florence Hedges and L. S. Tenny. This disease, which has been known on lime- and orange-trees in Jamaica for several years past, has recently been reported from Florida. Careful pruning is recommended and great care is advised in order to prevent the spread in this country of a new citrus fruit disease.

In the Gardener's Chronicle for 1911, G. Webb describes a successful treatment of hollyhocks against attacks of the rust (*Puccinia malvacearum*) by the application of a powder which consists of 1 bu. of slaked lime, 1 bu. of soot, 4 lbs. of flowers of sulphur, and 2 oz. of finely powdered sulphate of copper. This mixture should be passed through a fine sieve and the plants dusted with the powder three or four times during the growing season, in the morning while the dew is still upon them.

The first number of a new journal bearing the name *Mycologisches Centralblatt* and devoted to general mycology appeared in February, 1912, edited by Dr. C. Wehmer in Hannover, and published by Gustav Fischer in Jena. The associate editors are: Blackman, Blakeslee (U. S.), Elfving, Erikson, Fischer, Giesenhagen, Klebahn, Lagerheim, Maire, Meyer, Molisch, Transchel, Tubeuf, Went, Zellner, and others. These names are sufficient to indicate the broad scope of the new journal.

The report of the state botanist, Dr. C. H. Peck, for the year 1911, containing 120 pages of text and 9 colored plates, appeared about August 15, 1912, as Bulletin 157 of the New York State Museum. The most important part of this report is probably a monographic treatment of the 64 New York species of the difficult genus *Clitocybe*. The 23 species of *Psilocybe* found in the state are also monographed; and 44 new species of fungi are described. Among the interesting observations recorded, is one regarding the death of two children from eating *Pholiota autumnalis*, and another giving measurements showing the average daily growth of the giant puffball, *Calvatia gigantea*, after its appearance above ground.

Species of Hydnaceae appear to be scarce on the Pacific Coast, as elsewhere. The following, determined by Professor H. J. Banker, deserve mention:

Auriscalpium Auriscalpium (L.) S. F. Gray. Abundant on cones under coniferous trees; rarely in humus. Corvallis, Oregon, *Murrill 924, 984;* Mill City, Oregon, *Murrill 876.*

Manina cordiformis Scop. (*Hydnum Erinaceus* Bull.) On a log of *Pseudotsuga*. When drying, it smells strongly of licorice. Seattle, Washington, *Murrill 124.*

Manina coralloides (Scop.) Banker. Several large, creamy-white clusters 25 cm. high and bearing teeth 1 cm. in length were found on an immense log of *Pseudotsuga*. Seattle, Washington, *Murrill 121, 122.*

Hydnum dichroum Pers. Growing at the base of a deciduous stump in fir woods. Corvallis, Oregon, *Murrill 891.*

Odontia fimbriata (Pers.) Fries. Common in some localities. According to Professor Banker, the subiculum is remarkably thick for the species. Corvallis, Oregon, *Murrill 938;* Preston's Ravine, near Palo Alto, California, *Murrill & Abrams 1177, 1194.*

Professor John G. Hall, of Clemson College, South Carolina, contributes the following note on the identity of the fungus causing the large leaf-spot of chestnut:

MONOCHAETIA DESMAZIERII.—"In MYCOLOGIA, vol. 4, no. 4,

Mr. A. H. Graves describes a large leaf-spot chestnut and attributes the disease to *Monochaetia Desmazierii* Sacc., giving *Quercus rubra* as another host. I have also found the disease upon *Quercus nigra* in abundance in this neighborhood. Mr. Graves says that Dr. Farlow examined the original material of *M. Desmazierii* and found that the spores were not mature but that later he examined other material sent out by Desmazières and found that this material agrees with the fungus upon the chestnut, and that it also agrees with Desmazières' description of the fungus. He also cites the fact that Dr. Stevens and myself mentioned a similar disease of chestnut in our 'Diseases of Economic Plants,' and suggests that they may be caused by the same organism.

"I have every reason to believe that the disease described by Mr. Graves is identical with that described by us and is caused by the same fungus. However, the identity of the fungus seems to be in doubt. According to the descriptions in Saccardo, the only authority available to us when 'Diseases of Economic Plants' was published, the fungus is *Monochaetia pachyspora* Bubak, as it has three dark-colored cells in the center of the spore, while *Pestalozzia monochaeta* Desm., which becomes *M. Desmazierii* Sacc., has only two such cells. At the end of the description of *M. pachyspora*, Saccardo says that the spores of this fungus are thicker than those of *M. Desmazierii*, while our measurements agree with those given for *M. pachyspora*. It seems to me that the name *M. pachyspora* should become a synonym of *M. Desmazierii* but that the description of the latter should be revised to correspond with the original specimen and description as written by Desmazières."

NEW COMBINATIONS FOR TROPICAL AGARICS

A number of species of gill-fungi described by me from tropical America in MYCOLOGIA, 1911–1912, under genera not found in Saccardo's *Sylloge*, are here recombined for the benefit of those having or using herbaria arranged according to this work. Collectors, pathologists, and others who may not be in-

timately acquainted with taxonomic methods will probably find it more convenient to follow the one system until a comprehensive revison is completed, at least for some important groups.

CONOCYBE ECHINOSPORA	= **Galera echinospora**
HYDROCYBE ALBO-UMBONATA	= **Hygrophorus albo-umbonatus**
HYDROCYBE AURANTIA	= **Hygrophorus aurantius**
HYDROCYBE EARLEI	= **Hygrophorus Earlei**
HYDROCYBE FLAVOLUTEA	= **Hygrophorus flavoluteus**
HYDROCYBE HONDURENSIS	= **Hygrophorus hondurensis**
HYDROCYBE ROSEA	= **Hygrophorus roseus**
HYDROCYBE SUBCAESPITOSA	= **Hygrophorus subcaespitosus**
HYDROCYBE SUBFLAVIDA	= **Hygrophorus subflavidus**
HYDROCYBE SUBMINIATA	= **Hygrophorus subminiatus**
HYDROCYBE TROYANA	= **Hygrophorus troyanus**
LEPTONIELLA ATROSQUAMOSA	= **Leptonia atrosquamosa**
LEPTONIELLA CINCHONENSIS	= **Leptonia cinchonensis**
LEPTONIELLA EARLEI	= **Leptonia Earlei**
LEPTONIELLA MEXICANA	= **Leptonia mexicana**
LEUCOMYCES MEXICANUS	= **Amanita mexicana**
LEUCOMYCES MEXICANUS	= **Venenarius mexicanus**
LIMACELLA AGRICOLA	= **Lepiota agricola**
MELANOLEUCA JALAPENSIS	= **Tricholoma jalapensis**
MELANOLEUCA JAMAICENSIS	= **Tricholoma jamaicensis**
MELANOLEUCA SUBISABELLINA	= **Tricholoma subisabellina**
MYCENA JALAPENSIS	= **Bolbitius jalapensis**
MYCENA MEXICANA	= **Bolbitius mexicanus**
PLEUROPUS EARLEI	= **Clitopilus Earlei**
VENENARIUS MEXICANUS	= **Amanita mexicana**
VOLVARIOPSIS BAKERI	= **Volvaria Bakeri**
VOLVARIOPSIS CUBENSIS	= **Volvaria cubensis**
VOLVARIOPSIS EARLEI	= **Volvaria Earlei**
VOLVARIOPSIS JAMAICENSIS	= **Volvaria jamaicensis**

W. A. MURRILL.

INDEX TO AMERICAN MYCOLOGICAL LITERATURE

This index is prepared by Dr. B. O. Dodge, of Columbia University, and covers the same scope for the fungi as that covered by the general index published monthly in the Bulletin of the Torrey Botanical Club. It is not reprinted on cards for distribution.

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